Hymenopterous Parasites of the Coccidae, etc., in Hawaii

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PART I

Host List and Reference

Parasite	Host
Anagyrus swezeyi Timb. (1)*	Trionymus insularis Ehr.
† Marietta graminicola	6
Timb. (2)	
" nigricornis Timb. (3)	Trionymus insularis
† Marietta graminicola	" lounsburyi (Brain)
12a totta g. ammiosta	Pseudococcus longispinus (Targ.)
	Ripersia palmarum Ehr.
" antoninae Timb. (4)	Antonina indica Green
† Marietta graminicola	
† Thysanus dactylopii	
(Ashm.) (5)	
" dactylopii (How.) (6)	Pseudococcus filamentosus (Ckll.)
" spp.	Endemic spp. Pseudococcus
" saccharicola Timb.	Trionymus sacchari (Ckll.)
Leptomastidea abnormis (Gir.) (7)	Pseudococcus krauhniae (Kuwana)
Pauridia peregrina Timb. (8)	Pseudococcus krauhniae
Blepyrus insularis (Cam.) (9)	Ferrisiana virgata (Ckll.)
Protaenasius sp. (10)	Ferrisiana virgata
Coclaspidia osborni Timb. (11)	Pseudococcus boninsis (Kuwana)
† Thysanus dactylopii	1 Sendotottiis boninsis (Ikuwana)
Encyrtus infelix (Embl.) (12)	Saissetia hemispherica (Targ.)
† Quaylea whittieri (Gir.)	" nigra (Nietn.)
(13)	mgra (Wetti.)
` ,	Caisastia hamisthania
Encyrtus barbatus Timb. (14)	Saissetia hemispherica " niara
Ministrania Latinahui (That) (15)	Coccus longulus (Dougl.)
Microterys kotinskyi (Ful.) (15) † Quaylea whittieri	" viridis (Green)
i Quaytea whittieri	Ceroplastes rubens Mask.
	Pulvinaria mammeae Mask.
	" psidii Mask.
" flavus (How.) (16)	Saissetia nigra Collected
Aphycus alberti How. (17)	Coccus longulus Collected
" claviger Timb. (18)	Pseudococcus boninsis
" terryi Ful. (19)	1 Senaucoccus voninsis

^{*} Numbers refer to citations of literature, Part II. † Hyperparasite.

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Pseudaphycus utilis Timb. (20) Pesudococcus nipae (Mask.) Aphycomorpha araucariae Timb. Eriococcus araucariae Mask. (21)Adelencyrtus odonaspidis Ful. (22) Odonastis ruthae Kot. Anabrolepis extranea Timb. (23) Collected ex diaspine Anicetus annulatus Timb. (24) Eucalymnatus tessellatus (Sign.) Comperiella bifasciata How. (25) Aspidiotus rapax Comst. on bamboo Phenacaspis eugeniae (Mask.) Arrhenophagus albipes Gir. (26) Pseudococcus boninsis Xanthoencyrtus fullawayi Timb. (27) apterus Timb. (28) Trionymus insularis Spp. Plagiomerus hospes Timb. (29) Diaspinae? Tomocera californica How. (30) Saissetia nigra oleae (Bern.) Asterolecanium pustulans (Ckll.) Ceroplastes rubens Ceroplastes rubens ceroplastis Perk. (31) Scutellista cyaneae Mots. (32) Saissetia hemispherica † Quavlea whittieri nigra oleae Coccus longulus Aneristus ceroplastae How. (33) " viridis Pulvinaria urbicola Ckll. Ceroplastes rubens Saissetia nigra Saissetia nigra Coccophagus hawaiiensis Timb. (34) Coccus viridis ochraceus How. (35) Coccus viridis Morganella longispina (Morg.) Prospaltella koebelei How. (36) . 66 Aspidiotus cydoniae Comst. bicolor Timb. (37) rapaxAleyrodes vaporariorum Westw. transvena Timb. (38) hibisci Kot. sonchi Kot. Aphis sacchari Zehnt. Aleyrodes sonchi Encarsia versicolor Gir. (39) vaporariorum sonchi sp. (40) hibisci vaporariorum Diaspis bromeliae (Kern.) Aspidiotiphagus citrinus (Craw) (41)echinocacti Comst. Aulacaspis rosae (Bouché) Parlatoria zizyphus (Lucas)

> Pseudoparlatoria giffardi Chrysomphalus aonidum (Linn.)

> Lepidosaphes auriculata (Green)

rossi (Mask.)

Lepidosaphes beckii (Newm.) Aspidiotiphagus citrinus (Craw) (41)Aspidiotus perniciosus Comst. hederae (Vall.) " cyanophylli Sign. Phenacaspis eugeniae Hemichionaspis minor (Mask.) Aspidiotiphagus agilior Berl. (42) Parlatoria zizyphus Fiorinia fioriniae (Targ.) Lepidosaphes beckii Coccidencyrtus ochraceipes Gahan Diaspis boisduvali Sign. (43)Aphelinus maidis Timb. (44) Aphis maidis Fitch † Aphidencyrtus inquisitor sacchari (How.) (45) gossypii Timb. (46) gossypii Glover medicaginis Koch. semiflavus How. (47) Toxoptera aurantii (Fons.) Aulacorthrum circumflexum (Buck.) Aphytis diaspidis (48) Howardia biclavis (Comst.) † Marietta carnesi (How.) Diaspis bromeliae (49)echinocacti Aulacasbis rosae Hemichionaspis minor Aspidiotus cydoniae Comst. Pinnaspis buxi (Bouché) Aphytis chrysomphali (Mercet) (50) Diaspis bromeliae Aspidiotus cyanophylli rapax cydoniae Hemichionaspis minor Chrysomphalus aonidum rossi Lepidosaphes auriculata beckii Pseudoparlatoria giffardi Aleyrodes hibisci Eretmocerus corni Hald. (51) Archenomus perkinsi (Ful.) (52) Morganella longispina Leucaspis indica Howardia biclavis Pseudopteroptrix imitatrix Ful. (53) Aspidiotus rapax Signiphora aspidioti Ashm. (54) cyanophylli cvdoniae Collected. Found in California thoreauini Gir. (55) Parlatoria sp.

Collected

" sp. (56)
Astichus cyaneus Ashm. (57)

PART II

Citation of Literature

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PART	L III
Keys Useful in the Dis	crimination of Species
Key	1
To Subfamilies	Encyrtidae Aphelinidae Signiphoridae Pteromalidae
(including all the hymenopterous para viz:	
Chalcids with the thorax not stroquently not visible in the middle, with with hind wings not linear, not pedunc issuing in front of tip of abdomen, with which may be ring joints, and generall hind tibiae sometimes with a large cur. 1. Mesoternal pleurae not visible; make the long tibial spur.	ngly developed, pronotum small, fre- h hind femora not greatly enlarged, ulate at base, with ovipositor usually th antennae 5-13 jointed, 1, 2 or 3 of ly elbowed, with tarsi 4 or 5 jointed, rved spur. id-legs long, saltatorial, with a very
Antennae 11-jointed, occipital mar	Signiphoridae gin of vertex usually acute; notauli Encyrtidae

3. Antennae 13-jointed with two ring-joints and 3 joints to the club; Antennae never more than 8-jointed; notauli distinct; middle tibial spur

^{*} In limiting scope of keys to four subfamilies of Chalcidae supra, following hymenopterous parasites of Aphidae left out of consideration:

Lysiphlebus testaceipes
Ephedrus incompletus
Diacretus rapae
Pachyneuron siphonophorae
Eucoila sp.

Key 2

To Species of Signiphora (monotypical)

1.	With a well-developed discal bristle on fore-wing, antennal club proportionately shorter and widersp. indet. Without discal bristle on fore-wing, antennal club proportionately longer and narrower
2. 4	Antennal club all black, cephalic mesoscutum only slightly darkened, band on abdomen shorter
	Key 3
	To Encyrtid Species
	Females
1.	Antennae compressed, short and wide relatively
2.	Ochraceous-orange species
	Blue-black to green or metallic-brown
3.	Wingless, metallic brown
,	Not so, winged.
4.	Pedicel and funicle joints more or less terete
	Comperiella bifasciata
5.	Head broad or thick (fronto-occipitally), face and fronto-vertex not in the same planes
	Not so; head thin, or fronto-vertex and face more or less confluent 16
6.	Anterior margin of the fronto-vertex carinate
7.	Not so
7.	before the thickening in the submarginal vein
Ω.	Fronto-vertex nearly but not quite as wide as long
0.	Aphidencyrtus inquisitor
	Fronto-vertex wider than long
9.	Forewings marked with fuscous rays
10.	
	Not so11
11.	
	Forewings clear
12.	
13.	Not so
13.	Antennae white-tipped
14.	
	Fuscous gray-brown species Aphycus terryi

15.	Black band and spot on antennal scape
16.	Antennae long, slender, filiform
17.	Antennae with scape same diameter and thickness as flagellum
18.	Wingless species
19.	Antennal scape compressed, but not greatly expanded
20.	Antennal scape about 1/3 as wide as long, black banded on white
	Antennal scape about one-half as wide as long, not banded, black with a white line on dorsal edge forming a collar at distal end, white on distal half pedicel and entirely white beyond 1st funicle joint
21.	Antennae white beyond 2nd funicle joint
22.	Antennae black except for two white bands on scape
	Anagyrus nigricornis Antennae white-tipped (all of club), otherwise mostly black (only a white band apex scape, white pedicel except at base and whitish on parts of 5th and 6th funicle joints)
23.	Wings clear, no hair tufts on scutellum
24.	Antennae 3-jointed
25.	
	Not so
	Key 4
	To Species of Aphelinidae
	Females
1.	Tarsi 5-jointed 2 Tarsi 4-jointed 19
2.	Forewings with an obliquely transverse hairless line below stigma
3.	Wings mottled 4 Not so 5
4.	Antennal scape broadly expanded beneath, width nearly half the length (excluding radicle) and twice width of pedicelMarietta graminicola Antennal scape slender, no wider than pedicelMarietta carnesi
5.	المناج

	Head broad, body tapering behind to the apex of the abdomen, ovipositor comparatively tenuous and enclosed entirely by the ventrites so that in oviposition it is protruded backward in a more or less horizontal position
6.	Lemon-yellow species, wings clear, discal ciliation base of wings sparser
	Orange-yellow species, wings and abdomen somewhat fuscous, discal ciliation wings close and fine
7.	
	Speculum banded basad by one and one-half rows of setae or by one row and several more or less scattered setae just beneath the marginal vein; abdomen yellowish on basal segment
8.	Wings large and comparatively wide, the disc beyond the speculum finely and densely pubescent, the marginal fringe comparatively short and often inconspicuous
	with coarser, sparser setae, the marginal fringe comparatively long and conspicuous; abdomen except the lateral margins usually wholly yellow; the male with elongate antennae, the third funicle joint not much shorter than the long, slender club
9.	Antennae 7-jointed (scape, pedicel, 4 ring joints and a moderately long club)
10.	
10.	Antennal club 2-jointed
11.	
	forewings which are narrow, slightly dusky, naked area beyond and
	below stigmal vein reaching costal edge, bare path also around margin apical half wing, marginal fringes of forewings long, especially
	caudo-apically
	broad, without a bare area beyond the stigmal vein, marginal fringe less than one-half width of disc
12.	Stigmal vein lacking, wings with a very long fringe
13.	Antennae longer, anterior wings proportionately larger, discal ciliation closer, more extensive, infuscation deeper
14.	Marginal vein shorter than the submarginal
15	Black species with pale yellow scutellum
10.	Not so

16.	Orange yellow species with yellow antennae, hyaline wings and long marginal fringes
	Varicolored species: abdomen and pronotum brown, head entirely yellow, meso and metanotum dark yellow, legs pallid except hind femora which are dusky, antennae yellow, pedicel and last two funicle joints darker, wings hyaline, disc forewings below marginal vein faintly infuscated
17.	Antennal scape short, flagellum shortly flattened, hind tibiae flattened and with a row of short bristles above
18.	Ochraceous or dark honey yellow, antennae yellowish except pedicel, which is blackish, legs concolorous with thorax; antennae moderately long, first funicle joint only a little longer than wide; wings hyaline, veins fuscous
19.	Antennae 5-jointed, funicle joints 1 and 2 ring joints (male antennae 3-jointed, club very long, bent)
20.	Club 3-jointed, funicle joints about the same length widening a little outwardly
	Key 5
	To Pteromalid Species
1.	Scutellum exceptionally large, five times as long as pronotum, extending out over the abdomen to its middle, head broad and short, seen from in front triangular, antennae attached beneath middle of face, 8-segmented, scape fairly long, cylindrical, pedicel nearly as long as two first segments flagellum, these as long as broad, the following segments becoming somewhat shorter and broader, club not divided, as long as the three preceding segments together, pronotum very short with sharp anterior margin, parapsidal furrows complete and